

# **CENTRAL MARYLAND TRANSIT FACILITY BENEFITS ANALYSIS**

The purpose of this analysis is to estimate and depict costs of the no-build alternative to building and operating a Central Maryland Transit Facility. The costs of the no-build alternative are realized in terms of cost-savings to the participating jurisdictions and the Maryland Transit Administration (MTA). These are estimated based on reductions in the cost per hour of contracted transit services as compared to the current contracted costs, which include contractor provision of a facility. The estimated benefits in this analysis could also be considered as the costs of the no-build alternative—i.e., if the facility is not built, these savings will not be achieved.

The proposed Central Maryland Transit Facility would be publicly-owned, and is intended to serve existing and planned transit services in Howard County (HC), northern and western Anne Arundel County (AAC), and the greater Laurel area (including portions of Prince George's, Montgomery, and Anne Arundel Counties). In this analysis, the estimated cost savings are compared to estimated capital costs to determine the amount of time until the capital costs of the facility are offset by the cost savings (pay-back period).

Assumptions used in developing the estimate of benefits for the Central Maryland Transit Facility include:

1. Existing and proposed amounts of service measured in annual vehicle hours for each entity. See Tables 1, 2, and 3.
2. AAC services operated by the Corridor Transportation Corporation (CTC) are shown under AAC.
3. As displayed in Tables 1 and 2, proposed services by each jurisdiction, developed from Table 4, were incorporated into a single list of all planned services by year/phase and jurisdiction.
4. Current financial conditions suggest that full implementation of the expansions could well take a decade (from now), so the growth was spread over the next ten years. No expansion was planned for the MTA Route 320 service.
5. Following the tenth year, the service levels are assumed to remain the same over the life of the project (because it is at capacity—planned for 100 buses based on the proposed size of the facility).

**Table 1 - BUILD OUT ANALYSIS - PROJECTED EXPANSION**

<b>Year</b>	<b>Laurel</b>	<b>Anne Arundel</b>		<b>Howard County</b>		<b>MTA</b>	<b>Total</b>	<b>Total</b>
	<b>CAR</b>	<b>Fixed-Route</b>	<b>Paratransit</b>	<b>Fixed-Route</b>	<b>Paratransit</b>	<b>320</b>	<b>Fixed-Route Hours</b>	<b>Paratransit Hours</b>
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	16,040	0	0	0	0	16,040	0
4	0	0	0	0	0	0	0	0
5	445	22,920	7,112	3,048	3,556	0	26,413	10,668
6	0	0	0	0	0	0	0	0
7	0	0	0	4,064	0	0	4,064	0
8	3,568	0	0	8,648	0	0	12,216	0
9	0	8,648	3,556	1,196	0	0	9,844	3,556
10	7,346	0	0	1,248	0	0	8,594	0

**Table 2 - BUILD OUT - ESTIMATED ANNUAL SERVICE HOURS**

Base Year	Year	Laurel	Anne Arundel		Howard County		MTA	Total Fixed-	Total
		CAR	Fixed-Route	Paratransit	Fixed-Route	Paratransit	320	Route Hours	Paratransit Hours
Base Year	0	35,040	25,350	0	72,760	33,696	2,964	136,114	33,696
Year 1 Expansion		0	0	0	0	0	0	0	0
Year 1 Total	1	35,040	25,350	0	72,760	33,696	2,964	136,114	33,696
Year 2 Expansion		0	0	0	0	0	0	0	0
Year 2 Total	2	35,040	25,350	0	72,760	33,696	2,964	136,114	33,696
Year 3 Expansion		0	16,040	0	0	0	0	16,040	0
Year 3 Total	3	35,040	41,390	0	72,760	33,696	2,964	152,154	33,696
Year 4 Expansion		0	0	0	0	0	0	0	0
Year 4 Total	4	35,040	41,390	0	72,760	33,696	2,964	152,154	33,696
Year 5 Expansion		445	22,920	7,112	3,048	3,556	0	26,413	10,668
Year 5 Total	5	35,485	64,310	7,112	75,808	37,252	2,964	178,567	44,364
Year 6 Expansion		0	0	0	0	0	0	0	0
Year 6 Total	6	35,485	64,310	7,112	75,808	37,252	2,964	178,567	44,364
Year 7 Expansion		0	0	0	4,064	0	0	4,064	0
Year 7 Total	7	35,485	64,310	7,112	79,872	37,252	2,964	182,631	44,364
Year 8 Expansion		3,568	0	0	8,648	0	0	12,216	0
Year 8 Total	8	39,053	64,310	7,112	88,520	37,252	2,964	194,847	44,364
Year 9 Expansion		0	8,648	3,556	1,196	0	0	9,844	3,556
Year 9 Total	9	39,053	72,958	10,668	89,716	37,252	2,964	204,691	47,920
Year 10 Expansion		7,346	0	0	1,248	0	0	8,594	0
Year 10 Total	10	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	11	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	12	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	13	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	14	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	15	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	16	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	17	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	18	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	19	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	20	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	21	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	22	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	23	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	24	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	25	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	26	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	27	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	28	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	29	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920
Annual Total	30	46,399	72,958	10,668	90,964	37,252	2,964	213,285	47,920

**Table 3 - PERCENTAGE OF ESTIMATED ANNUAL SERVICE HOURS  
BASED ON PROJECTED EXPANSION**

<b>Year</b>	<b>Laurel CAR</b>	<b>Anne Arundel</b>	<b>Howard County</b>	<b>MTA 320</b>	<b>Total Hours</b>
0	20.63%	14.93%	62.69%	1.75%	169,810
1	20.63%	14.93%	62.69%	1.75%	169,810
2	20.63%	14.93%	62.69%	1.75%	169,810
3	18.85%	22.27%	57.28%	1.59%	185,850
4	18.85%	22.27%	57.28%	1.59%	185,850
5	15.92%	32.04%	50.72%	1.33%	222,931
6	15.92%	32.04%	50.72%	1.33%	222,931
7	15.63%	31.46%	51.60%	1.31%	226,995
8	16.33%	29.86%	52.58%	1.24%	239,211
9	15.46%	33.10%	50.26%	1.17%	252,611
10	17.76%	32.02%	49.09%	1.13%	261,205

**Table 4 - CENTRAL MARYLAND FACILITY - BUILD OUT ANALYSIS**

<b>Howard County</b>			
<i>Route/Location</i>	<i>Service Description</i>	<i>Estimated Revenue Hours</i>	<i>Expansion Year</i>
Green Route	Increase frequency: 30 minute headways during peak hours (weekdays) - 3 hrs am & 3 hrs pm (add 1 vehicle)	1,524	4
Maple Lawn (Rt. 216) to/from Savage (Rt. 1)	Weekday - Peak hours (3 hrs am & 3 hrs pm) hourly headways (2 vehicles)	3,048	5
Maple Lawn (Rt. 216) to/from Savage (Rt. 1)	Saturday - 9:00 am to 7:00 pm 2 hour headways (1 vehicle)	520	8
Columbia Mall to/from Rt. 108 & Rt. 175	Enhancement to the Red Route: Weekday - 6:00 am to 10:00 pm (add 1 vehicle)	4,064	7
Columbia Mall to/from Rt. 108 & Rt. 175	Enhancement to the Red Route: Saturday - 9:00 am to 10:00 pm (add 1 vehicle) Sunday - 10:00 am to 8:00 pm (add 1 vehicle)	1,196	9
Columbia Town Center Circulator Shuttle	Weekday - 7:00 am to 10:00 pm 30 minute headways (2 vehicles)	8,128	8
Columbia Town Center Circulator Shuttle	Saturday - 9:00 am to 11:00 pm 1 hour headways (1 vehicle) Sunday - 10:00 am to 8:00 pm 1 hour headways (1 vehicle)	1,248	10

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<b>Anne Arundel County</b>			
<i>Route/Location</i>	<i>Service Description</i>	<i>Estimated Revenue Hours</i>	<i>Expansion Year</i>
Fort Meade Base to BWI Airport via Arundel Mills	Weekday - 6:00 am to 10:00 pm hourly headways (1 vehicle) Weekend - 9:00 am to 9:00 pm 1 hour headways (1 vehicle)	5,372	3
Crofton/Odenton/Fort Meade	Weekday - 6:00 am to 10:00 pm hourly headways (2 vehicles) Saturday - 9:00 am to 7:00 pm 2 hour headways (1 vehicle)	8,648	9
Odenton/Fort Meade/Glen Burnie	Weekday - 6:00 am to 10:00 pm hourly headways (2 vehicles) Saturday - 9:00 am to 7:00 pm 2 hour headways (1 vehicle)	8,648	5
Glen Burnie to/from Fort Meade via Cromwell Station/BWI Airport/Arundel Mills Mall	Weekday - 6:00 am to 10:00 pm hourly headways (3 vehicles) Saturday - 9:00 am to 7:00 pm 2 hour headways (1 vehicle)	12,712	5
Anne Arundel Community College Campus Connection (Arnold, Glen Burnie Town Center, and Arundel Mills)	Weekday - 8:00 am to 10:00 pm 90 minute headways (3 vehicles)	10,668	3
Anne Arundel Community College Campus Connection	Saturday - 9:00 am to 7:00 pm 90 minute headways (3 vehicle)	1,560	5

**Table 4 - CENTRAL MARYLAND FACILITY - BUILD OUT ANALYSIS**

<b>Connect-A-Ride - Laurel</b>			
<i>Route/Location</i>	<i>Service Description</i>	<i>Estimated Revenue Hours</i>	<i>Expansion Year</i>
Route E	Increase frequency: Weekday - 30 minute headways weekdays (add 2 vehicles) Saturday - hourly headways (add 1 vehicle)	7,346	10
Route F	Increase frequency - add 2 am and pm trips (add 1 vehicle)	445	5
Burtonsville P&R and Old 29 Circulator	Weekday - 7:00 am to 7:00 pm hourly headways (1 vehicle) Saturday - 9:00 am to 7:00 pm hourly headways (1 vehicle)	3,568	8

<b>Demand-Responsive Service</b>			
<i>Route/Location</i>	<i>Service Description</i>	<i>Estimated Revenue Hours</i>	<i>Expansion Year</i>
Glen Burnie	Weekday - 1 vehicle 14 hours a day	3,556	5
Crofton	Weekday - 1 vehicle 14 hours a day	3,556	9
Odenton	Weekday - 1 vehicle 14 hours a day	3,556	5
Maple Lawn	Weekday - 1 vehicle 14 hours a day	3,556	5

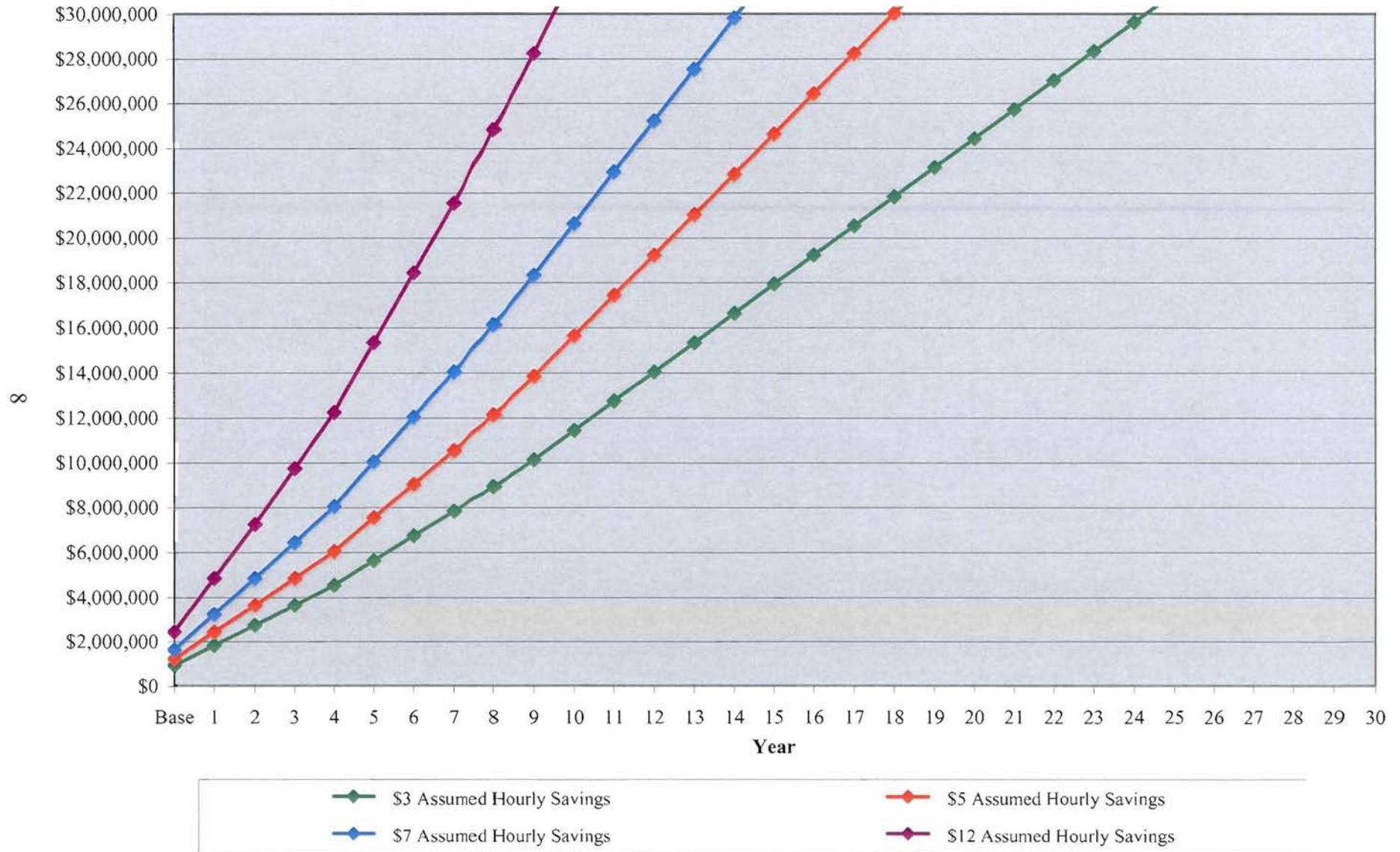
6. Project Benefits are estimated in terms of reduced operating costs. These reductions are likely to be manifested in two ways:
- Because contract operators will not need to rent or buy a facility, their hourly operating rates will be lower. It is assumed that the hourly operating rate will be three percent lower, based on examination of some bid proposals with line items for facility rent. In this analysis, the hourly price of \$54.84<sup>1</sup> for fixed-route service was reduced to \$53.19, so the benefit is \$1.65 times the number of service hours purchased in any given year. Similarly, the demand-responsive service price of \$50.00<sup>1</sup> was reduced by three percent, or \$1.50, to \$48.50 per hour.
  - Lower rates due to increased competition for the operating contract. Competing firms will all be on the same basis, able to utilize the public facility, so there will no longer be a perceived advantage for an incumbent that owns a facility in the service area. This should attract more bidders, which typically results in lower prices than would result from a single bidder. Estimating this effect is difficult, because a true scientific examination would require bids with and without a public facility, and everything else equal. Based on previous experience of CTC obtaining bids in this area, three alternative levels of benefit (reduced cost) per service hour were used: \$3, \$5, and \$7. A dashed line is used to show the benefit of a \$12 per hour saving, which is the upper bound based on some CTC experience from bids in which the incumbent knew there was no competition.
7. Constant 2005 dollars are used throughout, with no cost escalation built in.
8. Capital costs for the facility are not known at this time, so the attached tables and exhibits will cover a 30-year period and a value up to \$30 million. It should be noted that the facility will be developed in a phased construction process. At the outset the site will be sized to accommodate the eventual planned growth, however, the structures and parking will be sized to serve the existing fleets.
9. Annual cost savings are summed to provide the cumulative benefit. The point at which the benefit line crosses the estimated cost (once determined) is the year in which the benefits exceeded the capital cost.
- **Exhibit 1** presents the cumulative overall benefit (cost savings) for different levels of assumed cost reductions, **based on the Build Out growth assumptions** (shown in Tables 1 and 2). These are total benefits to society, not from the perspective of any single entity.
  - **Exhibit 2** presents the cumulative overall benefit (cost savings) for different levels of cost savings, **based on current service levels** being held constant. These are total benefits to society, not from the perspective of any single entity.

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<sup>1</sup> As reported by Corridor Transportation Corporation in FY 2006.

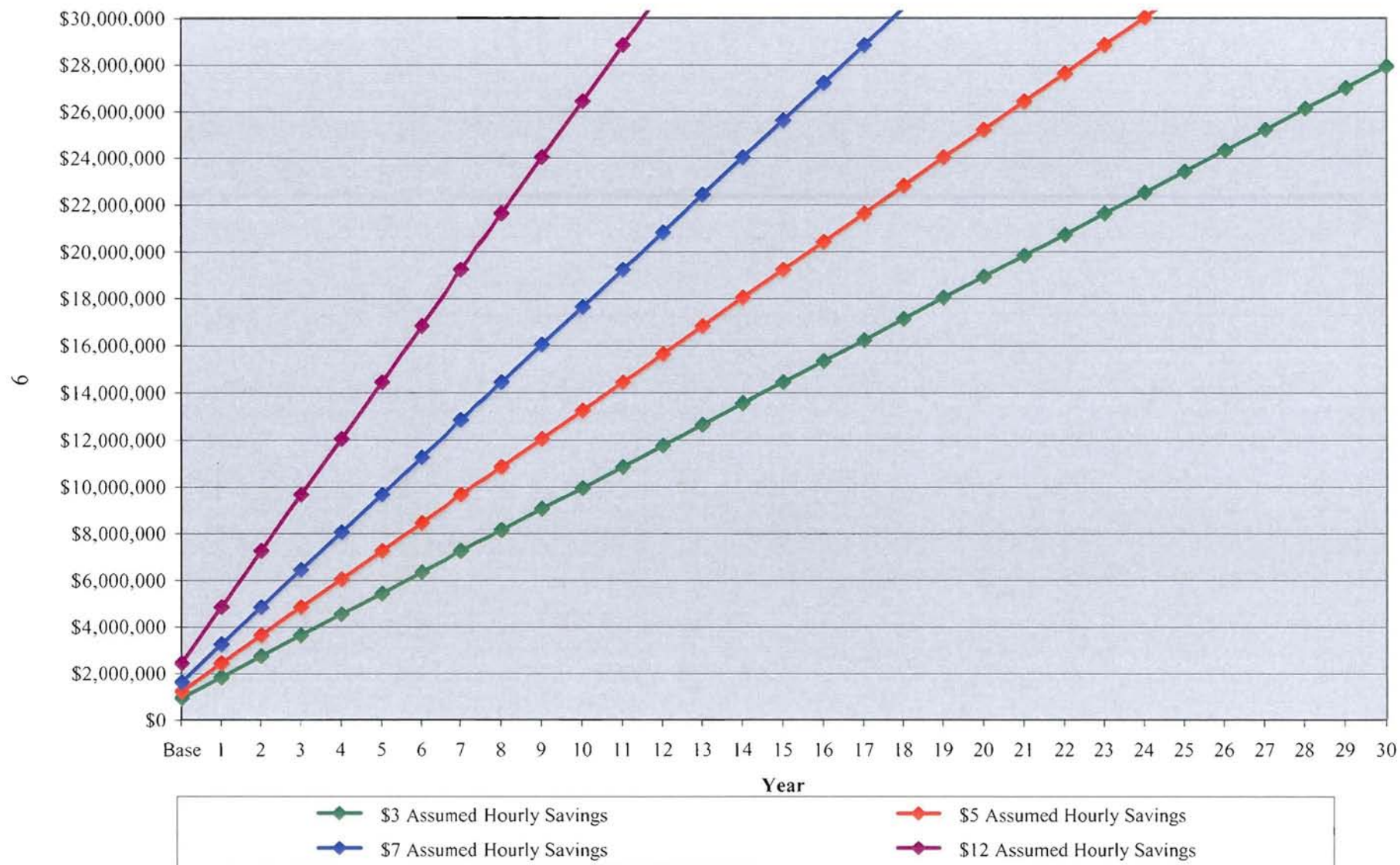


**Exhibit 1: PAYBACK PERIOD CONSIDERING THE TOTAL CUMULATIVE BENEFIT, BASED ON BUILD OUT GROWTH ASSUMPTIONS**





**Exhibit 2: PAYBACK PERIOD CONSIDERING THE TOTAL CUMULATIVE BENEFIT, WITH  
CURRENT SERVICE LEVELS CONSTANT**



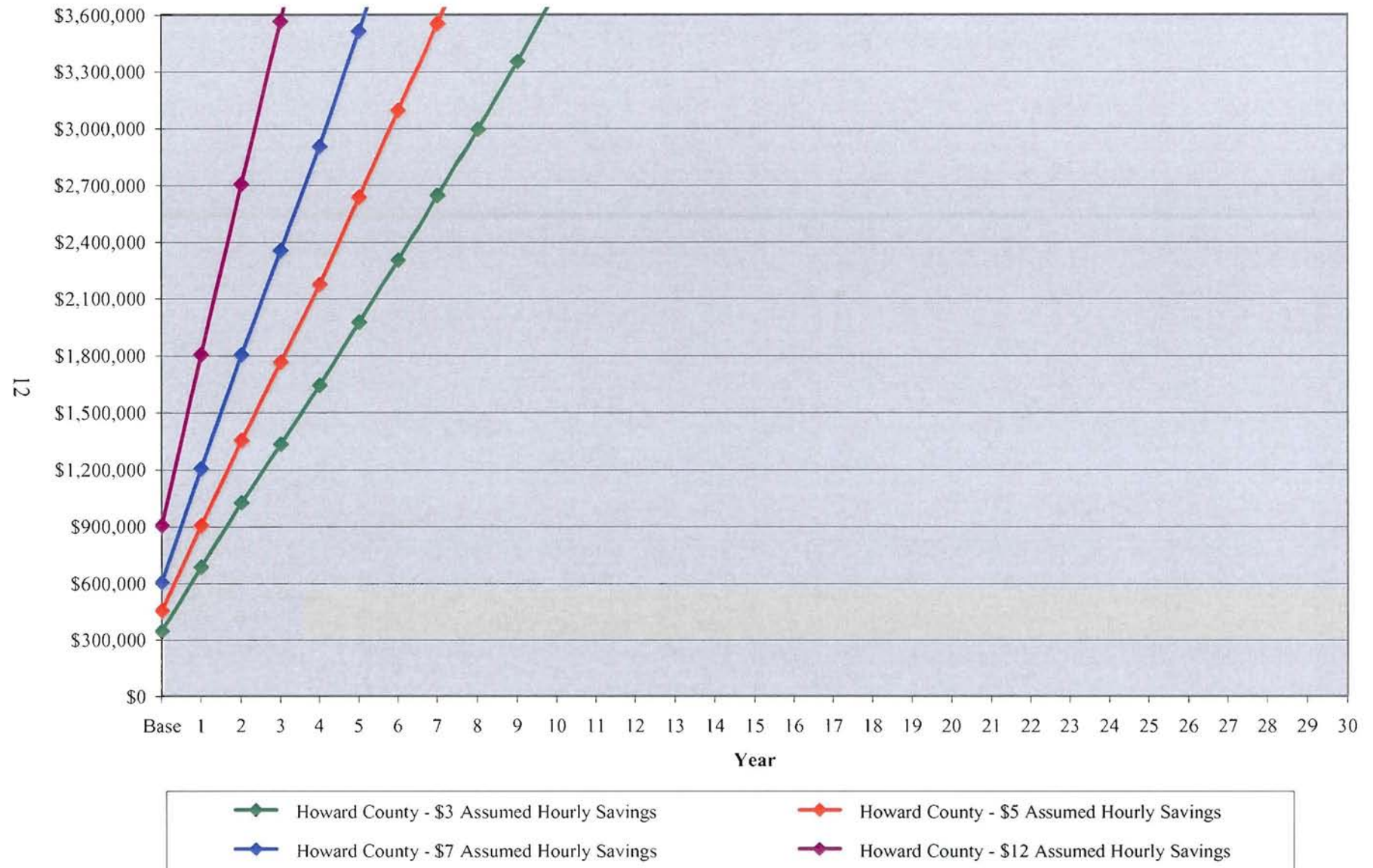
- **Findings** - Total cumulative benefits (cost savings) would reach \$30 million for the lowest assumed hourly savings (\$3) by year 25 for the build out scenario, but would take longer than 30 years if current service levels are held constant.
10. Table 5 provides a Total Sum of Annual Benefits over 30 years at the current service levels and the build out growth rates based on the following benefits:
- From a three percent savings due to lack of garage rent,
  - From increased competition from the \$3, \$5, and \$7 ranges, and
  - Total benefit (sum of the first two bullets)
11. Because different entities have different shares in the capital cost, different amounts of service, and different shares in the operating cost (and therefore different shares in the savings resulting from reduced hourly operating costs), separate analysis for each entity requires assumptions about state/federal and local shares, as well as the data regarding the amount of service. For example, Howard County:
- Funding for this project is expected to be covered by an 80 percent federal share and 20 percent local share. The Howard County share is roughly 60 percent (see Table 3) of the 20 percent local share. Thus, Howard County is estimated to pay 12 percent of the total capital cost of the facility, lowering the cost ceiling to \$3,600,000 for the Howard County share (using a total value up to \$30 million).
  - Howard County's share of the total benefit (operating cost savings) for the project was 62.69 percent in FY 2005, based on its share of the total service hours provided for all jurisdictions, as seen in Table 3. This declines to 49.09 percent over the next ten years, as the other services are projected to grow faster in a relative sense.
  - The Howard County portion of the benefit attributable to service in the County is 60 percent of the total hourly benefit for the services it purchases, because the local share of the net deficit for the Howard County services was around 60 percent in FY 2005 (for all services combined). It is assumed that this remains constant.
  - **Exhibits 3 and 4** are from a Howard County perspective, **assuming either current service levels or the planned expansion rates**, at the lowest hourly savings assumption (\$1.65 hour for fixed-route and \$1.50 for demand-responsive services due to absence of rent, plus \$3 per hour due to increased competition).
  - **Findings** – Howard County would capture their costs through cumulative benefits even at the high end ceiling of \$3,600,000 after ten years for both the build out and current service levels.

**Table 5**  
**CENTRAL MARYLAND**

**TOTAL SUM OF ANNUAL BENEFITS**  
**(30 YEARS)**

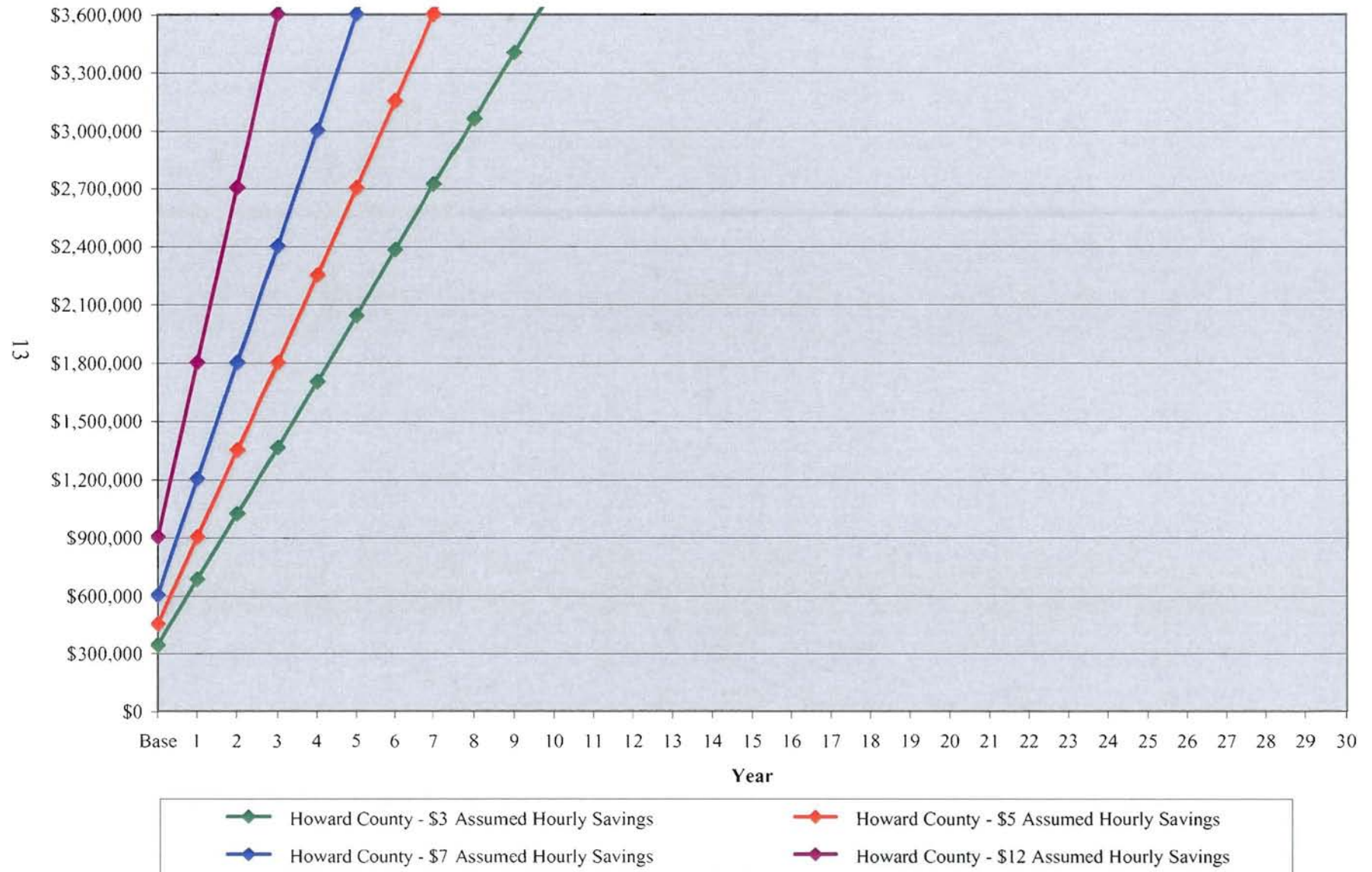
<b>Benefit</b>	<b>Current Service Levels</b>	<b>Build Out Growth Rates</b>
1) From 3% Savings Due to Lack of Garage Rent	\$10,850,000	\$13,270,000
2) From Increased Competition		
Range of Assumptions:		
\$3 Per Revenue Hour	\$15,500,000	\$23,100,000
\$5 Per Revenue Hour	\$24,800,000	\$37,300,000
\$7 Per Revenue Hour	\$37,200,000	\$52,300,000
3) Total Benefit (Sum of #1 and #2):		
\$3 Level	\$26,350,000	\$36,370,000
\$5 Level	\$35,650,000	\$50,570,000
\$7 Level	\$48,050,000	\$65,570,000

**Exhibit 3: PAYBACK PERIOD CONSIDERING THE HOWARD COUNTY CUMULATIVE BENEFIT,  
BASED ON BUILD OUT GROWTH ASSUMPTIONS**





**Exhibit 4: PAYBACK PERIOD CONSIDERING THE HOWARD COUNTY CUMULATIVE BENEFIT,  
WITH CURRENT SERVICE LEVELS CONSTANT**



## 12. Deadhead Analysis Benefits:

- To assess the differences in operating costs from each of the potential sites, deadhead travel from each site to the points where revenue service begins and ends were estimated. This was accomplished by documenting the distance and time from each site (current maintenance facility, Fort Meade, and Hock) to all the current and proposed beginning and ending points for each route using the build out growth assumptions. This enabled us to estimate the weekly deadhead hours.
- Tables 6 and 7 display the yearly deadhead hours, yearly deadhead cost, and total sum of deadhead cost over 30 years by maintenance location and by type of service (fixed-route and demand-responsive) for both the current service and build out scenarios, respectively.
- It should be noted that deadhead is an operating function which requires a higher match for the state and local jurisdictions than capital items. Additionally, it is advantageous to lower deadhead hours since it is a non-revenue service.
- **Findings** – Yearly deadhead cost savings (associated with deadhead hours) are only realized from service out of the Hock site. The total deadhead savings over 30 years for the Hock site is \$1.5 million for the base/current service level and \$2 million for the build out scenario. It should be noted that deadhead costs actually rise using the Fort Meade site over the existing contractor facility site. The additional deadhead cost over 30 years for the Fort Meade site is \$3 million for the base/current service level and \$2.4 million for the build out scenario.

**Table 6 - YEARLY DEADHEAD COST BASED ON FACILITY LOCATION  
BASE SCENARIO - CURRENT SERVICE**

<b>Maintenance Location</b>	<b>Yearly Deadhead Hours</b>		<b>Yearly Deadhead Cost</b>		<b>Total Sum of Deadhead Cost (30 Yrs.)*</b>		<b>Present Value of Deadhead Costs**</b>	
	<b>Fixed-Route Service</b>	<b>Demand-Responsive Service</b>	<b>With Contractor Facility</b>	<b>With Publicly Owned Facility</b>	<b>With Contractor Facility</b>	<b>With Publicly Owned Facility</b>	<b>With Contractor Facility</b>	<b>With Publicly Owned Facility</b>
Current Maintenance Facility	5,500	3,443	\$473,740		\$14,212,213		\$7,354,095	
Fort Meade Site	6,748	4,421		\$573,336		\$17,200,079		\$8,900,163
Hock Site	5,275	2,956		\$423,948		\$12,718,430		\$6,581,138

Contract Rate - Fixed-Route (Contractor Owned Facility)      \$54.84  
Contract Rate - Demand-Responsive Service (Contractor Owned Facility)      \$50.00

Contract Rate - Fixed-Route (Publicly Owned Facility)      \$53.19  
Contract Rate - Demand-Responsive Service (Publicly Owned Facility)      \$48.50

\*Assumes the same deadhead costs per year.

\*\*At 5% per year, 30 years, monthly.

NOTE: Calculation for the total sum of deadhead cost and present value of deadhead cost assumes the current service level for 30 years.



**Table 7 - YEARLY DEADHEAD COST BASED ON FACILITY LOCATION  
BUILD OUT SCENARIO - CURRENT AND PROPOSED SERVICE**

<b>Maintenance Location</b>	<b>Yearly Deadhead Hours</b>		<b>Yearly Deadhead Cost</b>		<b>Total Sum of Deadhead Cost (30 Yrs.)*</b>	
	<b>Fixed-Route Service</b>	<b>Demand-Responsive Service</b>	<b>With Contractor Facility</b>	<b>With Publicly Owned Facility</b>	<b>With Contractor Facility</b>	<b>With Publicly Owned Facility</b>
Current Maintenance Facility	9,739	4,192	\$743,683		\$22,310,491	
Fort Meade Site	10,913	5,034		\$824,607		\$24,738,214
Hock Site	9,363	3,704		\$677,662		\$20,329,851

Contract Rate - Fixed-Route (Contractor Owned Facility)	\$54.84
Contract Rate - Demand-Responsive Service (Contractor Owned Facility)	\$50.00
Contract Rate - Fixed-Route (Publicly Owned Facility)	\$53.19
Contract Rate - Demand-Responsive Service (Publicly Owned Facility)	\$48.50

\*Assumes the same deadhead costs per year.